CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS
CHUKA/EMBU/THARAKA

EXAMINATION FOR THE AWARD DIPLOMA IN ACCOUNTANCY, DIPLOMA IN BUSINESS MANAGEMENT AND DIPLOMA IN PROCUREMENT AND LOGISTICS MANAGEMENT

DIBM 0122: BUSINESS MATHEMATICS II

STREAMS:DIBM,DPLM,ACCOUNTANCY   **TIME: 2 HOURS**

DAY/DATE: TUESDAY 10/04/2018   **2.30 P.M – 4.30 P.M**

INSTRUCTION:

- **Answer question one and any other two questions**

QUESTION ONE

Explain the meaning of the following terms (illustrate where necessary)

(i) Equiprobable events   [2marks]

(ii) Column matrix   [2marks]

(iii) Random experiment   [2marks]

(b) Kadege borrowed a loan of ksh 80,000 from Equity bank whose interest rate was 9% p.a. Given that the repayment period was 5 years;

(i) Calculate the annual installment amount payable.   [3marks]

(ii) As an investment consultant prepare the respective loan amortization schedule that you would use to advise Kadege once approached for advise.   [6marks]

(c) The probability of Ongata construction company winning a tender in Chuka University is $\frac{2}{3}$ while that of winning a similar tender in Meru University is $\frac{5}{9}$. Given that the probability of winning tenders in both universities is $\frac{14}{45}$ determine the

probability that the company will win a tender in Meru University given that it has already won a tender in Chuka University. [3marks]

(d) Solve the following simultaneous equations (use crammers rule) . [6marks]

x-y+5z = -6

3x+3y-z = 10

x +3y+2z = 5

(c) Discuss the decision making environment of a business. [6marks]

QUESTION TWO

(a) Momanyi is considering two investment projects :X and Y whose initial investment and net cash flows are as shown below.

Project	Initial cash Outlay (sh)	Net annual cash inflows (sh)			
		Year 1	Year 2	Year 3	Year 4
X	10,000	8,000	3,000	7,000	6,000
Y	10,000	6,000	6,000	6,000	6,000

Required :

Using net present value (NPV) investment appraisal technique advise Momanyi on the most preferable investment to undertake given that the projects are mutually exclusive. Assume a discounting factors of 15% p.a. [10marks]

(b) Given that P = $\begin{bmatrix} 1 & 3 & 2 \\ 0 & 4 & 4 \\ 2 & 1 & 1 \end{bmatrix}$ find the determinant of matrix p [3marks]

 (c) A research in Chuka Univeristy showed that a student who stays in the library for over two hours has s failure rate of 2%, the one who stays in the library for less than 2 hours has a failure rate of 5% while a student who never goes to the library has a failure rate of 12%. In Chuka University 60% of students stay in the library for over 2 hours, 30% stay in the library for less than 2 hours while the rest never bother the library services.

Required :

(i)   Construct a probability tree diagram to illustrate the above findings. [3marks]

(ii) Determine the probability that a student never went to the library given that he/she failed.   [4marks]

QUESTION THREE

(a) Mr. Masese is considering investment opportunities X,Y and Z under boom recession and recovery economic conditions. The pay off matrix in ksh is as shown below.

Investment	State of nature		
	Boom	Recession	Recovery
X	5000	7000	3000
Y	-2000	10,000	6000
Z	4000	4000	4000

Advise him on the best investment opportunity using;

(i)   Max-max cretion   [2marks]

(ii)   Maxi –min criterion   [2marks]

(iii) Savage principle   [2marks]

(iv)   Hurwics criterion, assume $\propto$ = 0.3.   [2marks]

(v)   Laplace criterion   [2marks]

(b) Given that A = $\begin{bmatrix} 4 & 3x \\ 2x & x \end{bmatrix}$ is a singular matrix

Find the value of x   [3marks]

(c) Distinguish between closed leontief model and open Leontief model.   [3marks]

(d) Find the present value of an investment yielding a return of ksh 240,000 after 6 years at 9% p.a compounded monthly.   [4marks]

QUESTION FOUR

(a) A two sector economy consisting of oil and coal interacted as shown below in a particular production period.

		Input	
Output	oil	Oil	Coal
	Coal	0.4	0.5
		0.3	0.2

The projected demands for the two sectors ;oil and coal are 20 units and 50 units respectively.

Required :

(i) Derive the respective technology matrix.   [1mark]

(ii) Determine the number of units each sector should produce to satisfy the projected demand.   [6marks]

(b) Wamuyu's savings account has ksh 100,498. The bank pays an interest of 6% p.a compounded semi annually. How long will it take for the savings to grow to ksh 120,000. [3marks]

(c) Other than net present value (NPV) list any three investment appraisal techniques commonly used by commercial enterprises.   [3marks]

(d) Suppose A and B are two events such that $P(A) = ⅓$, $P(B) = ½$ and $P(A \cup B) = ⅔$ find;

(i) $P(A \cap B)$ [2marks]

(ii) $P(A/B)$ [2marks]

(e) A particular company's logo is SAYONA. A special committee has been constituted to review the logo to avoid customers confusion of its products with those of a competing company whose logo almost looks alike. In how many ways can the letters of the logo be arraged if the committee intends to use the same letters to modify the logo? [3marks]